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DRAWINGS ATTACHED

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(54) SOUND-DAMPING ELEMENTS

(71) We, ETABLISSEMENTS JOS. VERSTRAETE & FILS, P.v.b.a., a body corporate organized and existing under the laws of Belgium, of Zuidkaai, 18—19, of Izegem, Belgium, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statements:—

This invention relates to sound-damping elements, and sound-damping panels comprising a plurality of such elements. The elements and panels are used to form sound-damping structures, for example the walls and ceilings of rooms.

According to the present invention a sound-damping element comprises in cross-section a first limb, a second limb parallel to and spaced from the first limb, and a transverse web connecting the first and second limbs, to form a substantially H-shaped section in which the contours, on each side of the web, of the facing surfaces of the first and second limbs and the associated face of the web are such as to define a recess which is open at one end and semi-cylindrically curved at the other end, and the first limb is longer in a direction normal to the longitudinal direction of the sound-damping element and thicker than the second limb.

The invention also provides a sound-damping panel comprising a plurality of juxtaposed sound-damping elements.

A sound-damping element according to the present invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a perspective view of the sound-damping element,

Figure 2 is an enlarged cross-section of the sound-damping element shown in Figure 1,

Figure 3 shows diagrammatically a plurality of sound-damping elements as shown in Figures 1 and 2 when assembled to form a sound-damping panel,

Figures 4, 5 and 6 show in diagrammatic cross-section, three alternative modes of making corner assemblies for sound-damping panels comprising a plurality of sound-damping elements as shown in Figures 1 and 2.

Referring firstly to Figures 1 and 2, the sound-damping element 1 is of a substantially H-shaped cross-section, comprising two parallel limbs 2 and 3 joined by a transverse connecting web. The limb 2 comprises two aligned limb portions 4, 5 while the limb 3 comprises two aligned limb portions 6, 7, each of the limb portions 4, 5 being longer than the respective parallel limb portions 6, 7.

The limb 2 is also thicker than the limb 3 as is clearly visible in Figure 2, being for example approximately twice as thick. The regions in which the connecting web joins each of the limbs 2, 3 are radiused, as shown in Figure 2, so that the facing surfaces of the limb portions 4 and 6 and the adjacent surface of the connecting web define a substantially U-shaped recess 8 in Figure 2, while the facing surfaces of the limb portions 5 and 7 and the adjacent surface of the connecting web likewise define a substantially U-shaped recess 9 in Figure 2. The recesses 8, 9 are therefore open at one end and semi-cylindrically curved at the other.

The longitudinal free edge portion of each of the limb portions 4, 5 is grooved as shown in Figure 2, to form projecting lip portions 10, 11 respectively, thus defining rebates 12, 13. In the assembled position of two sound-damping elements, as clearly shown in Figure 3, the lip portion 10 and the rebate 12 of a first sound-damping element 1 cooperate with the lip portion 11 and the rebate 13 of the adjacent sound-damping element 1.

Formed in the outward surface of the limb 3 of the sound-damping element 1 is a longitudinally extending groove 14. The width of the groove 14 is such that when any two sound-damping elements 1 are placed in a side-by-side position as shown in Figure 3, the distance between the end face of the limb portion 7 of one sound-damping element 1 and the end face of the limb portion 6 of the adjacent sound-damping element 1, is exactly equal to the width of the groove 14. The

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width of the groove 14 is therefore equal to the difference in the overall lengths (that is, the dimensions taken from left to right for example of Figure 2) of the respective limbs 2, 3, less the dimension, considered in the same direction, of one of the rebates 12, 13.

Referring now to Figure 3, a plurality of sound-damping elements 1 as described hereinbefore are arranged side-by-side so that the lip portion 10 of a first sound damping element engages into the rebate 13 of a second adjacent sound-damping element, and likewise the lip portion 11 of the first sound-damping element engages into the rebate 12 of the second sound-damping element. Consequently, the recess 8 of the first sound-damping element co-operates with the recess 9 of the second sound-damping element to form a chamber 15 which is in communication with the ambient atmosphere by way of a gap 16 formed between the end faces of the limb portions 7, 6 of the two adjacent sound-damping elements.

The sound-damping elements are secured, for example nailed, to a grating or a similar support surface, for example by placing in position a sound-damping element 1 (that is shown on the left-hand side of Figure 3, for example), nailing it to the support surface by way of the limb portion 5, then engaging the lip portion 10 of the adjacent sound-damping element 1 into the rebate 13 of the secured sound-damping element 1, and so on. This produces a sound-damping panel including a plurality of chambers 15, each of which is in communication with the ambient atmosphere, for example a room, by way of a respective gap 16, as described above. The chambers 15 thus act as sound-absorbing chambers insofar as sound waves produced by noises in the room enter the chambers 15, causing the limb portions 6, 7 to vibrate in sympathy with and absorb the sound waves.

Figure 4 shows the corner assembly of two sound-damping panels made up as described above, the limb portion 4 of the uppermost sound-damping element 1 of the vertical panel being shortened along the entire length of the sound-damping element, so that the end face of the limb portion 4 lies against the downwardly facing surface (in Figure 4) of the limb portion 7 of the end sound-damping element 1 of the horizontal panel. The dimensions of the sound-damping elements are such that the limb portion 6 of the uppermost sound-damping element 1 of the vertical panel engages into the groove 14 of the adjacent sound-damping element 1 of the horizontal panel, as is clearly shown in Figure 4, while the end faces of the limb portions 5, 7 of the end sound-damping element of the horizontal panel lie flush with the outward surface of the uppermost sound-damping element 1 of the vertical panel.

Figure 5 shows an alternative form of corner assembly utilising a lath or like member 17 of L-shaped cross-section, which engages between the limb portions 5, 7 and 4, 6 of the respective adjoining sound-damping elements 1. The sound-damping elements 1 and the member 17 are secured together for example by nailing.

Finally, Figure 6 shows yet another form of the corner assembly. In this case, a rectangular lath or like member 18 is fitted between the limb portions 5, 7 of the end sound-damping element 1 of the horizontal panel, and the limb portion 6 of the uppermost sound-damping element 1 of the vertical panel is shortened so that the limb portion 4 of the uppermost sound-damping element 1 of the vertical panel extends at least partly across the face of the member 18, as clearly shown in Figure 6.

It is apparent that the precise mode of forming the corner assembly will depend on the particular circumstances of use.

The sound-damping element 1 is preferably made of wood, for example soft wood, although it may also comprise a plastics material. Use of a high-quality wood will enable the sound-damping panel to present a high-grade surface finish. In spite of their relatively complex configuration, the sound-damping elements may be readily manufactured on a four-plane planing machine.

The sound-damping elements and panels according to the invention may be employed for example to cover and/or construct ceilings, partitions, dividing walls, door panels and the like.

Various other modifications may of course be made without departing from the scope of the invention as defined by the appended claims.

WHAT WE CLAIM IS:—

1. A sound-damping element comprising in cross-section a first limb, a second limb parallel to and spaced from the first limb, and a transverse web connecting the first and second limbs, to form a substantially H-shaped section in which the contours, on each side of the web, of the facing surfaces of the first and second limbs and the associated face of the web are such as to define a recess which is open at one end and semi-cylindrically curved at the other end, and the first limb is longer in a direction normal to the longitudinal direction of the sound-clamping element and thicker than the second limb.

2. An element according to claim 1 wherein the thickness of said second limb is half the thickness of said first limb.

3. An element according to claim 1 or claim 2 wherein a groove extending in the longitudinal direction of the sound-damping element is formed in the outwardly facing surface of said second limb.

4. An element according to claim 3 wherein a groove is formed in each longitudinal free edge portion of said first limb, thus defining respective rebates facing in opposite directions, wherein the width of the groove is equal to the difference between the dimension, measured in a direction normal to the longitudinal direction of the sound-damping element, of said first limb and the dimension, measured in said normal direction, of said second limb, less the dimension, measured in said normal direction, of one of said rebates.

5. A sound-damping element substantially as hereinbefore described and illustrated in the accompanying drawings.

6. A sound-damping panel comprising a plurality of juxtaposed sound-damping elements according to any one of the preceding claims.

7. A sound-damping panel according to claim 6, substantially as hereinbefore described with reference to the accompanying drawings.

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Fig. 1.

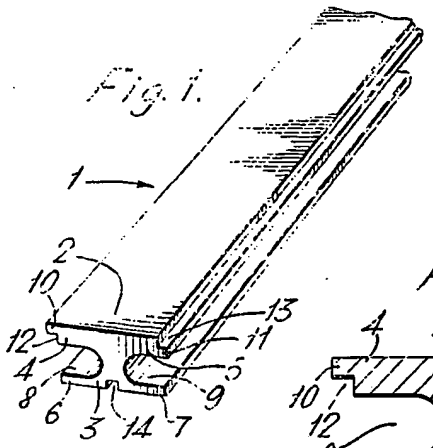

Fig. 2.

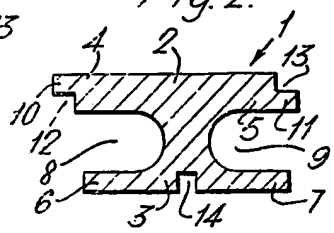

Fig. 3.

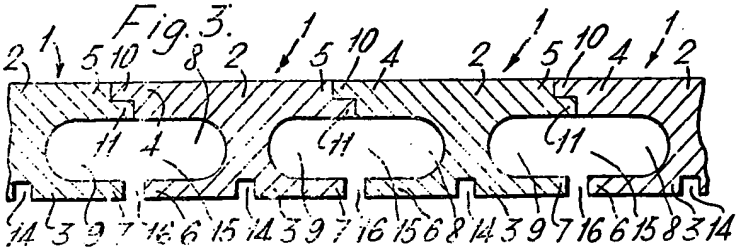

Fig. 4.

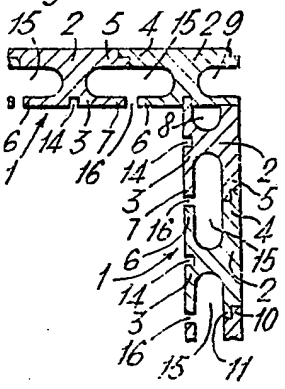

Fig. 5.

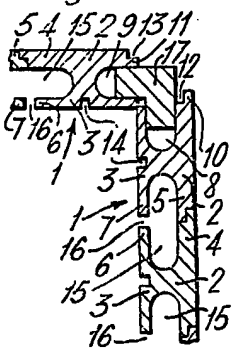

Fig. 6.